Virtual Beef

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Benefits of a Green Maternity Ward for Beef Cows

Tom Hamilton, Beef Program Lead – Production Systems, OMAF and MRA

Its calving time! That phrase strikes fear and trepidation into the hearts of many cow-calf producers. Few things on the farm produce as much drawn out stress and as many sleep interrupted nights as ensuring the safe delivery of this year's bawling "cash crop". The popular Mar-Apr calving season leads to a constant battle against the weather, the build- up of manure in the maternity pens and yards, and all too often, an intense skirmish with scour causing pathogens.

New Liskeard Calving Systems Trial

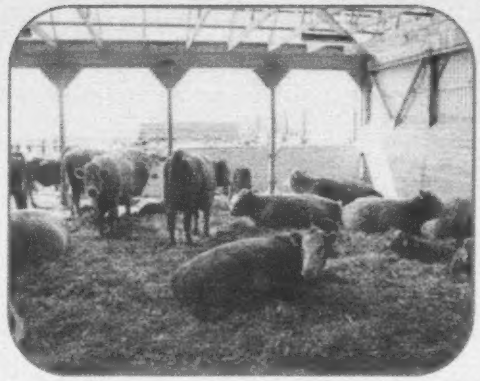

Figure 1. Housing for winter calvers

At the New Liskeard Agricultural Research Station, a calving systems trial was initiated in 1992. At that time, the herd was split into two management groups. One group in February-March in a modern open front barn with separate calving pens, while the other group calved on pasture in June-July. Data collection was intensive, and along with the usual animal performance records and health data, feed consumption and the labour required to manage the herds was also collected. The trial ended after 5 years, and during this time it was found that pasture calving cows received far less assistance at calving and raised healthier calves than barn calvers. There was a lower labour requirement for the pasture calving herd, while stored feed consumption was similar. The weaning weights of pasture calving cows were somewhat lighter, but economic analysis showed that the overall, the cost of producing a pound of weaned calf was much lower for the pasture calving herd.

After the end of the formal experiment in 1997, the two calving groups were maintained, and all of the animals were used in numerous experiments over the years. However, a large database of animal performance an health records were collected from 1998 on. In 2012, the Ontario Cattlemen's Association (aka Beef Farmers of Ontario) requested that the herd management data accumulated over time be analysed and reported. OCA(BFO) have a direct interest in the New Liskeard Herd, since they own all of the cows and their progeny.

The Data Set

Figure 2. Summer calvers on pasture

A total of 3293 females were exposed to breeding over 15 years, with 1673 in the Winter group and 1620 from the Summer group. These were comprised of 2344 cows and 949 heifers. All breedings were by AI, typically with an initial round of fixed-time insemination followed by a resynchronization of those not bred. Cows were usually checked for pregnancy twice, and initial check to evaluate the first insemination and a final check to evaluate the second insemination.

Pregnancy Rate

Result of the final pregnancy check are shown in Table 1. Overall, the animals bred to calve in Winter had a small (3.3%) but statistically significant advantage over those bred to calve in Summer. When evaluated on an age group basis, only the difference in cow groups was significant.

Table 1. Pregnancy Rat at Final check by Age and Season (%)

	Calving Season		Probability
	Winter	Summer	
Cows + Heifers	**78.4**	**75.1**	* (.017)
Cows Only	**80.0**	**76.8**	*** (.001)
Heifers Only	**77.8**	**73.3**	NS (.10)

From Figure 3, a couple of trends can be identified. During the first 3 years, the Summer group had numerically superior pregnancy rates, but in general this was reversed during the remainder of the trial. Higher pregnancy rates for Summer calvers were observed during the 5 year formal trial. Reasons for the change observed in this evaluation may be related to the disproportional use of young sire semen in the Summer calving herd, as part of a strategy to accelerate genetic change. It is known that the fertility of yearling bull semen is generally lower than that of older bulls.

Another trend apparent in Figure 3 is the reduction of breeding success as time progressed. This may be attributable in part to the introduction and increasing use of yearling sire semen in both groups, and may also be in part due to changes in the methods of fixed-time synchronization techniques used.

Pregnancy Rate to Final Pregnancy Check

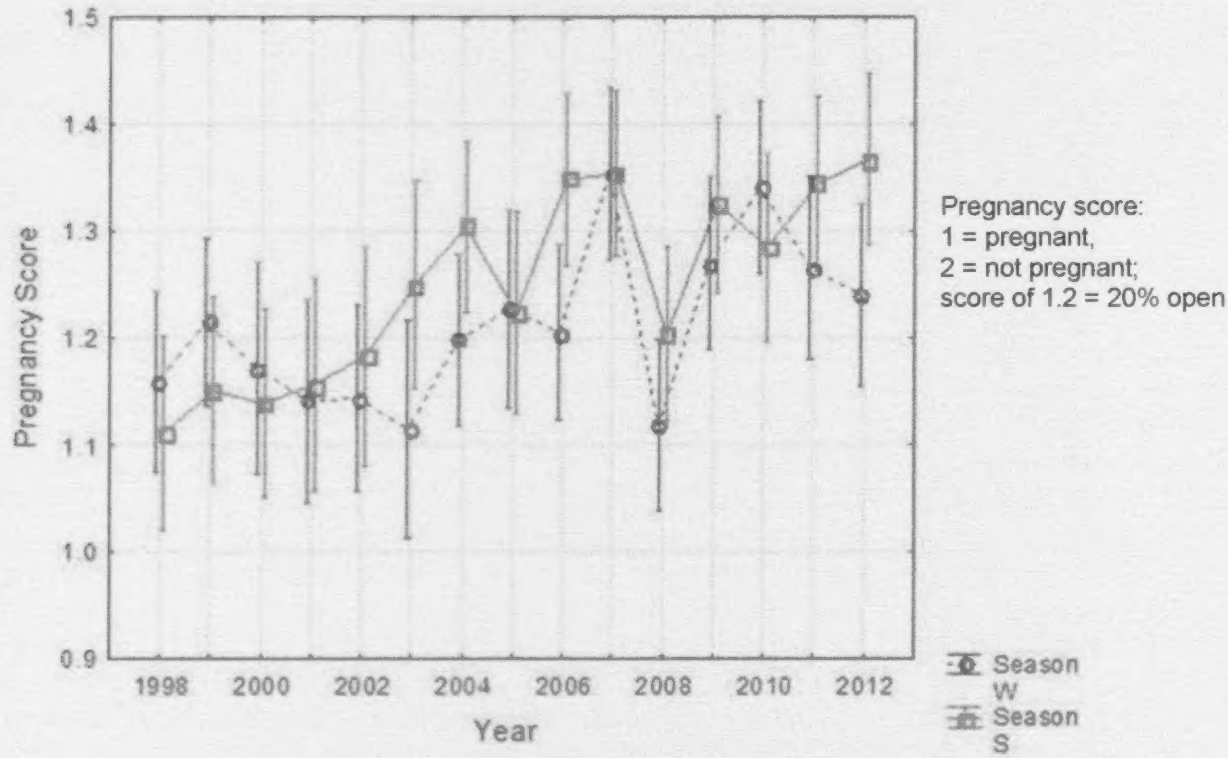

Figure 3. Comparison of Pregnancy Rate to Final Pregnancy Check, by Season

Calving Ease

Calving ease was recorded as unassisted, easy pull, medium pull, hard pull or surgical. These were converted to scores (1 to 5, respectively) for analysis.

Calving ease score was higher for the Winter born calves (1.15) than for Summer born calves (1.06) showing that there was lower incidence and/or severity of calving problems in summer (Table 2). This showed that calving on pasture can result in fewer and/or less severe calving problems than barn calving. This is likely due in part to lower average birth weights in the Summer group. It may also be partly due to an increased ability of cows to give birth in the pasture environment, and/or the reduced opportunity for humans to intervene.

The rate of calving assistance was also evaluated, by grouping calving outcome into two categories, either unassisted or assisted. Average assist rate for the Winter group (7.8%) was more than double that of the Summer group (3.0%) (Table 2). This is likely due partially to the lower birth weights of summer born calves and also to the reduced opportunity for herdsmen to intervene when cows were on pasture. As well, it is possible that cows calving on pasture within sight of other cows and in a more natural environment are less psychologically stressed and better able to express their natural calving ability.

Table 2. Calving Outcomes by Season

	Calving Season		Probability
	Winter	Summer	
Calving Ease Score - Herd	**1.15**	**1.06**	*** (p<.001)
Calving Ease Score - Heifers	**1.34**	**1.12**	*** (p<.001)
Calving Ease Score - Cows	**1.08**	**1.04**	NS (p>.05)
Assisted Births - Herd (%)	**7.8**	**3.0**	*** (p<.001)
Assisted Births - Heifers (%)	**15.5**	**5.9**	*** (p<.001)
Assisted Births - Cows (%)	**4.6**	**1.8**	** (p<.01)

Calf Health

Disease occurrence and treatments of calves from birth to weaning were obtained from NLARS herd health records from 2005 - 2012. These data were summarized to give both the number of separate disease occurrences and the total number of treatments administered (Table 3). For example, a calf identified as having pneumonia and treated on 4 consecutive days for it would be classed as having 1 disease occurrence and 4 total treatments. One calf could have multiple disease occurrences (and additional treatments) over time.

The results showed that Winter-born calves had an incidence of disease which was 3 times that of Summer-born calves, and a total treatment rate which was 2.25 times higher than Summer calves. One reason for this difference may be due to a higher density of animals in the barn environment, which would promote a greater build-up of pathogens compared with the pasture environment. This would likely present a greater disease challenge to the calves born in the barn environment. As well, Summer calving cows had less manure tag on them than Winter calving cows (personal observation), which should lead to less transfer of disease causing organisms to the calf during initial suckling attempts.

While it is theoretically possible that pasture born calves may have received fewer treatments simply due to less intense observation than barn born calves, this is unlikely since their survival rates were not different, and the average weaning weight of barn born calves was only minimally greater.

Table 3. Calf Health

	Calving Season		Probability
	Winter	Summer	
Calf Survival, Birth to Weaning (%)	**95.4**	**94.9**	NS (>.05)

Calf Survival

Calf survival was calculated as the proportion of calves weaned compared with the number born. Calf survival was high, and not different between seasons. This showed that although the Summer calving herd was managed under a much more extensive regime, with less human observation during the critical neonatal period, calf survival was not compromised.

Table 4. Calf Survival by Season

	Calving Season		Probability
	Winter	Summer	
Disease Occurrences (number per 100 calves born)	**46.7**	**15.5**	*** (p<.001)
Total Treatments (number per 100 calves born)	**83.0**	**37.0**	*** (p<.001)

Conclusion

The results of this review of 15 years of data supports the earlier findings in terms of calving ease and calf health. Pasture calving is a viable production system which requires far less intervention at calving time and produces healthier calves which require far few treatments. Cows can calve successfully with little intervention in the "Green Maternity Ward". Producers wanting to reduce the need for observation at calving time and/or expand their cow herds should consider a production system based on summer calving on pasture.

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Pasture Utilization

Jack Kyle, Grazier Specialist, OMAF and MRA

Pasture is an excellent low cost means of feeding livestock, but requires proper management of both the forage and the livestock. The forage must be managed to optimize growth, while the livestock must be managed to optimize utilization. Your goal as you manage your pastures is to grow as much grass as possible and have it consumed at the point of optimum nutrition and quantity with minimal waste. How much of the pasture growth is actually eaten/utilized by the grazing livestock is going to influence the success (profitability) of your pasture business - producing a lot of growth is of little benefit it is not utilized by livestock!

Factors That Affect Utilization

- Forage that is over mature will not be effectively utilized, since mature tall grass is both hard for the animals to bite off and also difficult to digest.
- Forage that is too short (less than 5-7 cm) does not allow the animal to get a big bite, so they spend extra time walking to get enough forage.
- Forage that is contaminated by feces or urine will not be eaten
- Forage that is tramped or laid on is less likely to be eaten.
- If there is a wide choice of plants to graze, then the most palatable will be eaten and the less desirable will be left behind. These plants then have a chance to continue growing and over time will dominate the pasture.

Ways to Influence Utilization

- Minimize the area and amount of grass that is available at any one time – this means there is a higher proportion of fresh grass available to the animal.
- Smaller paddocks reduce walking/tramping and encourage grazing and resting.
- Provide water in the paddock to minimize the amount of time spent away from the pasture you want them eating.
- If there are significant manure patties that are not breaking down consider harrowing to spread these patties out and speed up the breakdown. Cattle eating grass that is optimum for performance will have loose manure that will not be in dried patties.
- If there are mature plants including weeds, clipping can improve utilization.
- Livestock grazing a "new" or "fresh" paddock focus on grazing, become full quicker and will spend more time resting rather than wandering looking for another bite of palatable grass.
- Intake of high quality forage is much better than low quality – increased ADF decreases intake because of slow digestive passage.

Number of Paddocks and Frequency of Moves

Two factors that influence utilization are the number of paddocks and frequency of moves.

From the Purdue Extension Forage Field Guide:

- A continuously grazed pasture will result in 40% utilization of the forage
- A 4 paddock system will result in 45% utilization
- An 8 paddock system will have about 60% utilization
- A 12 paddock system will have about 65% utilization
- And moving to a 24+ paddock system will bring the utilization rate up to about 75%

This is a huge increase in productivity of your pastures!

Increasing the number of paddocks allows you to increase the frequency of moves to fresh pasture.

Also from the Purdue Extension Forage Field Guide we see that

- Moving every 3 days to fresh pasture will give a 70% utilization rate
- Moving every 7 days reduces the pasture utilization rate to 50%
- 14 day moves results in only 40% utilization of the pasture.

These two factors go together – the more paddocks you have the more frequent the moves and the longer the rest period for the grass to recover from the previous grazing and grow fresh grass for the next grazing.

These are seasonal utilization rates, at each grazing pass the best results are achieved when you have the livestock remove about 50% of the available forage. When removing just 50% of the available forage the plant can quickly recover and re-grow. There is minimal impact on the root system with the loss of about 50% of the top growth but once more than 50% is removed the impact on the roots is much more significant.

The more paddocks you can organize for each group of livestock and the more frequent the moves to a fresh paddock the better the performance you will see from your pastures.

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Can Infrared Imaging Assess Fertility and Feed Efficiency in Yearling Bulls?

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Background

Reproductive success is one of the most important factors affecting the profitability of the cow-calf herd, and bull fertility is a key component for that. Bull fertility is known to be influenced by many factors, such as genetics, nutrition, age, and body composition. Recent research has suggested undesirable associations between improved feed efficiency and fertility traits in young beef bulls. And this is an important issue, since improved feed efficiency is a main objective of beef cattle production systems.

Breeding soundness evaluation (BSE) is an assessment of the reproductive system of bulls that includes the measurement of scrotal circumference (SC) and semen quality. Scrotal circumference is associated with testicle size and sperm production. The uniform temperature distribution of the scrotum is also important to ensure normal sperm production and consequently good semen quality. The temperature patterns of the scrotum can be evaluated using infrared imaging, an effective non-contact technology with proven efficacy for this application. Infrared imaging has also shown potential for assessing feed efficiency, but more studies are needed to define the most appropriate locations to perform this assessment.

The Experiment

In order to gain further knowledge about these topics, an experiment was undertaken at the University of Guelph's Elora Beef Research Centre. The objectives of this study were to:

- Verify the relationship between fertility and feed efficiency;
- Evaluate the relationship between semen quality and infrared imaging;
- Further investigate the relationship between infrared imaging and feed efficiency.

A group of 34 yearling bulls were housed in indoor pens equipped with automated feeding stations allowing for measurement of individual feed intake. They were fed a corn based diet on a free choice basis. Animals were weighed and ultrasound assessments (backfat thickness, rib eye area, rump fat thickness and marbling score) were done every 28 days until the end of the 112 day feeding test. The bulls were then slaughtered, at an average of 12.5 months of age. Feed efficiency was evaluated as Residual Feed Intake (RFI), which is defined by animal's actual intake compared with its predicted intake based on its body weight, average daily gain, and middle trial ultrasound traits. Animals which are more feed efficient will have lower RFI values.

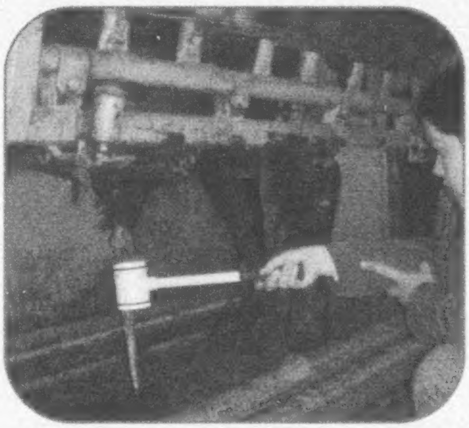

Figure 1. Semen collection from yearling bull through electro-ejaculation.

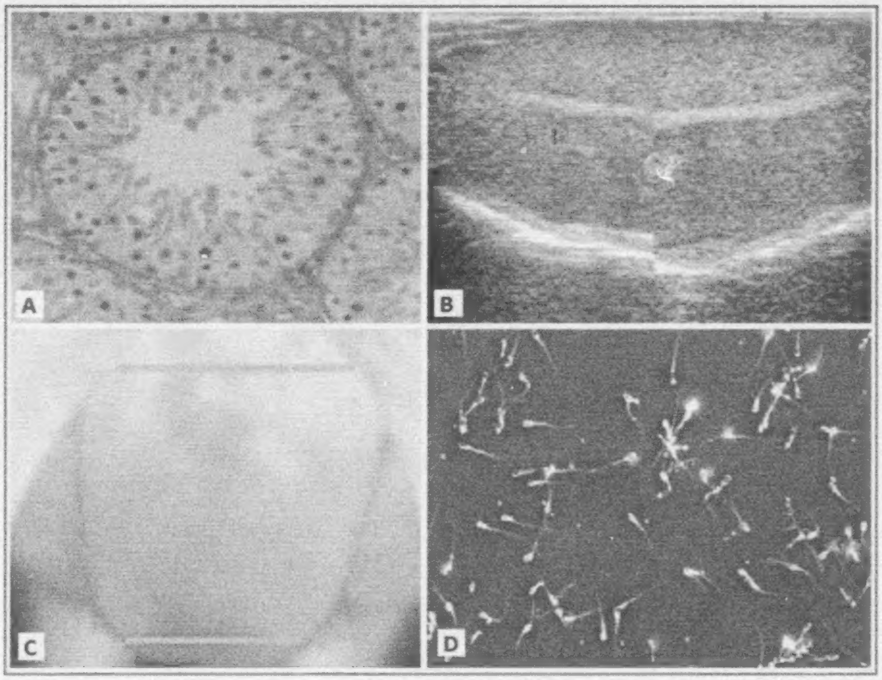

Figure 2. A few examples of techniques for assessing fertility in bulls. A: Testicular histology; B: Ultrasound imaging; C: Infrared thermography; and D: Semen analysis.

[RFI = Actual Feed Intake – Predicted Feed Intake]

At the end of the feeding test, BSE was performed and semen was collected with an electro ejaculator (Figure 1). Infrared pictures were taken at five different body locations (eye, snout, front foot, hind foot and scrotum) (Figure 2), Semen motility, concentration and morphology were analyzed (Figure 2). Ultrasound images of the testicles were also performed (Figure 2) Slaughter and carcass measures were collected at the University of Guelph abattoir. In addition, testis samples were collected at slaughter for histology analysis (Figure 2).

What We Found

Animals were divided into three feed efficiency groups (high, medium and low-RFI) for statistical analysis. Mean values for the RFI groups are shown in Table 1. There were differences on percentage of normal morphology and tail pathologies for high-RFI and low-RFI groups. However, no differences on SC ($P>0.10$) were observed across RFI groups, indicating that this assessment must be complemented with the actual microscopic analysis of semen to properly assess bulls' fertility. Less efficient bulls had greater temperature variation on the top portion of the scrotum, which is associated with deleterious effects on semen production. In addition, more feed efficient bulls had higher temperatures at the inner corner of their eyes, a body location never considered before for assessing feed efficiency. No differences among RFI groups for carcass traits were observed ($P>0.10$). This indicates the appropriateness of the RFI determination employing ultrasound measurements to account for differences on carcass composition. This is important for having the bulls under the same comparison basis (no difference on body composition).

We found a positive correlation (0.48, $P<0.01$) between normal morphology and RFI, and a negative correlation (-0.48, $P<0.05$) between tail pathologies and RFI. A positive correlation (0.44, $P<0.01$)

was found between the scrotum top side temperature standard deviation and the percentage of loose head pathologies. Similarly, the bottom side of the scrotum temperature standard deviation is suggested to be associated with fertility, as indicated by the amount of head pathologies (0.32; P<0.10). No associations were observed between infrared images and feed efficiency for the other body locations scanned (snout, foot and scrotum) based on a single infrared scanning. Analysis of the testiclular ultrasound and testis tissue are currently being carried over.

Table 1: Mean values according to the RFI group for each trait*

Traits	High-RFI (less efficient)	Medium-RFI (average efficiency)	Low-RFI (more efficient)
Normal sperm morphology (%)	$74.1^{a,c}$	69.8^{c}	$62.8^{b,c}$
Sperm tail pathologies (%)	$1.64^{a,c}$	3.03^{c}	$5.01^{b,c}$
Scrotum Top side SD (ºC)	1.02^{a}	0.63^{c}	$0.81^{b,c}$
Eye corner average (ºC)	$33.33^{a,c}$	33.80^{c}	$34.20^{b,c}$

*a, b, c: values within a row having a different superscript letter differ (P < 0.05).

What it means to the Industry

Improved feed efficiency appears to be negatively associated with semen quality in beef bulls. However, infrared imaging could be applied as a complementary technology for the assessment of the bulls' fertility to minimize any negative impact of selecting for feed efficiency. As well, the inner corner of the eye may be a promising body location for assessing feed efficiency based on a single infrared image.

Acknowledgments

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Securing Your Hay Supply in a Cash Crop World

Barry Potter, Agriculture Development Advisor, OMAF and MRA

Hay has been in short supply this past year, as the dry weather reduced overall yield for forage crops across the province in 2012. However, a more permanent influence on hay supply in your area may very well be the high price of commodities such as corn, soybeans, cereals and canola. Hay has been the weak sister of the crop world, and beef farmers watch in frustration as cash

croppers outbid them for rented land. Hay gets ploughed under in their “backyard”, leaving beef farmers to either source hay elsewhere or sell cows.

Yet in a cash crop world, the benefit of forages in a rotation is quite evident. Nitrogen carry over, soil structure improvement, and ease of cultivation are some of the more obvious advantages. But how can a beef farmer convince his cash crop neighbour to incorporate forages in a sustainable crop rotation? Read on for an innovative marketing message.

A farmer in my area recently related the partnership he has bargained with his neighbouring cash cropper. The beef farmer provides forage seed (typically inexpensive timothy and red clover) to the cropper, who seeds it down after harvesting this year’s cash crop. The beef farmer pays market rate rent for the next 2 years, and harvests the forage. At the end of the 2 year, the cropper plows down the forage and returns the field to cash crop production.

The beef farmer harvests a supply of high yielding, high quality forage for 2 years. The cropper reaps the benefits of forages in the rotation without having to buy seed or deal with harvesting and selling the forage, and also receives cash for the rental of the land.

What does a cropper get from growing forage? Dr. Doug Youngblut has outlined the many advantages:

- soil structure - soil after forage is more stable. more biological activity in the soil - more roots, microbes and worms.
- the fibrous roots give soil granular structure
- the worms, bacteria, fungi, etc., build water stable aggregates that help stop erosion and destruction reduced crusting, compaction and runoff.
- forage roots also create large pores (macropores) in the soil, which helps water drain away quickly.
- tiny pores (micropores) created by organic matter in the soil aggregates help retain water during dry spells.crops after forages have more root room, as the forage roots have created channels in the soil for the crop roots to follow and explore growing forage crops breaks up disease and insect proliferation and the forages stimulate beneficial organisms to consume pathogens.
- nutrients are more available after forages. Forages have a narrow carbon to nitrogen ratio, which increases organic activity and mineralizes nitrogen.
- legumes fix nitrogen which leaves a residue for the next crop to use.

Cash crops such as corn will often see a 5 to 20 % yield increase when following forages. The crop farmer also benefits from the residual nitrogen effect, which can be up to $70 in the first year following legumes. At the University of Guelph (W. Deen et al,) a 20 year study of the impact of rotation showed that growing alfalfa in a rotation provided excellent economic return as compared to other crops.

Table 1. Rotation Effects on Income

Rotation	1st year net revenue, $/ha	2nd year net revenue, $/ha	2 Year total net revenue, $/ha
C-C-C-C	73	107	180
C-C-B-B	113	85	198
C-C-Brc-Brc	94	99	193
C-C-S-S	80	68	148
C-C-S-Wrc	86	89	175
C-C-A-A	112	130	242

C=Corn, B=Barley,rc=underseeded red clover, S=soybeans, W= winter wheat, A=alfalfa

The cropper gets increased yield after forages, decreased fertilizer costs of up to $70 nitrogen credits, and increased soil quality. These are some of the many benefits for the cash cropper in growing forages. But why wouldn't the cash cropper just make hay and sell it? First of all, he or she may not have the appropriate equipment. Secondly, making dry hay can be a challenge. If you as a beef farmer offer to remove any production and marketing challenges for the cropper, leaving him with only the benefits, you may score some of his cropping acres as a forage supply.

How could it work? One scenario would see you supply the grass seed for him either to plant with a cover crop or as direct seeding. You would sign a lease agreement, paying him the going rate for land rental. He would allow you to remove the forage crop, typically for two years. After that, he plows down the green crop, obtaining the benefits of the forages which are listed above.

Cost analysis

Seed costs would be approximately $30 per acre. If the deal is that the forages are put in with a cover crop the cash cropper would be spraying and fertilizing the crop in the first year. So as a beef farmer you are left with harvesting and hauling the feed, and paying rental. Harvesting costs can be around 2 cents per lb. Expected yield should be around 3 tonnes per acre. If land rent is $200 per acre, the cost for rent is 3 cents per pound of hay. Initial establishment is 0.2 cents per lb. For somewhere less than 5.5 cents per pound you have secured a forage supply, created a new partnership and developed a formula for long term sustainability in the beef industry.

Forage from this system feeds a cow for a wintering season for around $425. While this may be higher than you would like, you would hope that the forage from the cash cropper land is not all of your forage needs for the year. And it's a lot less than the cost of buying hay on the cash market.

References

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Do Environmental and Animal Factors Distort Infrared Imaging in Cattle?

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Introduction

Infrared radiation is emitted from all objects, and when measured can be used to determine surface temperature. Technology to measure infrared radiation was first used in 1950's for military use and has gradually evolved and has gained use in livestock sector. Some of these applications include early detection of inflammatory diseases, animal welfare, body condition score and feed efficiency. Despite all these possibilities, the use infrared technology is still limited for commercial operations because of the lack of standardized operation procedures for adequately performing infrared assessments across different scenarios.

Animal factors such as physical activity, feed intake prior to imaging, and individual response to drugs, could mask the underlying biological target to be assessed due to uncontrolled changes on the patterns of emitted radiation. Environmental factors include dirt, as well as weather factors such as direct sunlight and drafts, would also have the potential to skew infrared analysis due to interferences on the radiation emitted by the animals' body surface.

In addition, the choice of the infrared camera based on the different technological options (with different image resolution, cost, sensitivity and array of applications) should be taken into account. As well, the lack of consistency between judges analyzing the same thermographs could also interfere in the infrared imaging analysis.

The objectives of this study included evaluating animal factors' (exercise, drug effects and heat increment of feeding) and environmental factors' (sunlight, forced wind, and debris on animals' surface) effects on the infrared assessment, and to compare different types of infrared cameras and the repeatability of such assessments between judges.

Figure 1 Infrared imaging assessment (head imaging) of a heifer restrained in a squeeze chute.

What We Did

The study was divided into different trials: a repeatability trial, a camera and judge comparison trial, an exercise trial, a drug trial, a forced wind trial, a debris trial, a sunlight exposure trial, and a heat increment of feeding trial. All the trials were conducted at Elora Beef Research Center

(University of Guelph) and consisted of baseline photos taken before and after every trial to compare temperature readings, and were taken while the animals were maintained in a head chamber calorimeter to assess metabolic rate, with the exception of the repeatability trial.

The repeatability trial was conducted using 127 weaned calves restrained in a squeeze chute while photos of their head were taken twice, consecutively with the FLIR SC2000 camera (Figure 1). The calves were again imaged three days later. Two groups of calves were assessed in two different weeks and body weight was measured on both occasions. The camera and judge comparison trial was conducted using different infrared cameras (FLIR i40, T250 and SC2000). Pictures of different body locations of a yearling beef heifer were taken from seven different distances (1.0m, 1.5m, 3.5m, 5.5m, 9.5m, 11.5m and 15.5m) with the three cameras. The same images were also analyzed by two judges to verify the repeatability of the interpretation across different judges.

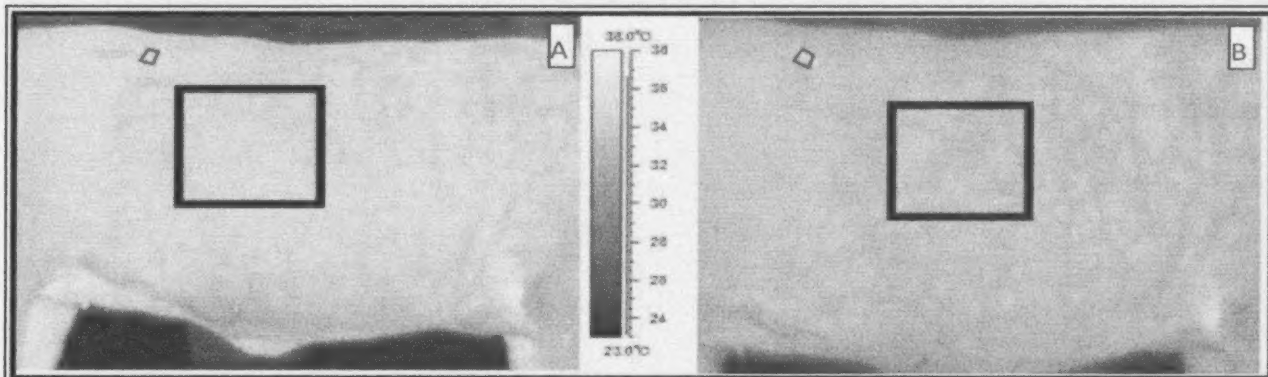

Figure 2. With the help of the infrared camera, it is possible to determine the surface temperature of the cattle which may be influenced by several factors.

As shown in figure 2, with the help of the infrared camera, it is possible to determine the surface temperature of the cattle, which might be influenced by several factors. For instance, during the forced wind trial, the start temperatures within the large squares (fan off; image A) were noticeably greater (35.9°C), than after exposure to the wind (33.5°C) (fan on; image B).

The exercise trial used two yearling beef heifers. It consisted of 15 minutes of exercise (running) and three post-exercise photos were taken with the T250 camera every 20 minutes. The drug trial involved xylazine (sedative) and atipamezole (anti-sedative), with xylazine administered first, followed by a dose of atipamezole. Two sets of photos were taken every 10 min after the xylazine injection and two more were taken after atipamezole. The forced wind trial used the SC2000 camera; the fan was turned on (wind speed of 17 km/h) and blew on the right side of the animal. Photos were taken every 10 min for five rounds. The fan was then turned off and photos were taken every 10 min for 4 rounds (Figure 2). The debris trial consisted of two types of debris: manure and shavings. Pictures were taken before and after spreading manure on the caudal areas of all four legs, from hock to the bottom of the hoof. Similarly, shavings were placed on top of the animal's back, while images were taken before brushing off the shavings and after.

What We Found

1. Distance had a strong influence on the temperature measured at given location. For instance, at 1m and 15m from the animal's eye the readings were 35°C and 32°C respectively.
2. In addition, the models of infrared cameras evaluated gave substantial differences in thermographs taken on same location and time. For example, the T250 camera at 3.5m gave a reading of 35.5°C while the SC2000 read 36.5°C.
3. The judge trial showed a high correlation of 0.96 for temperature interpretation across the different judges.
4. The weaned calf trial showed a high correlation between the body weights of the animals on the different days (0.92, $P<0.01$) and between the two consecutive eye thermographs taken consecutively (0.94, $P<0.01$). However, correlations comparing the different days were low and inconsistent across the two weeks (0.42 and 0.30, $P<0.01$ for the eye on the first day compared to the eye on the second day in the two weeks, respectively).
5. The exercise trial revealed a noticeable increase in temperature following the exercise. The hind foot, with a baseline temperature of 32.1°C, had risen to 35.1°C, post-exercise.
6. The drug trial demonstrated a decrease in temperature after the xylazine administration (hind foot temperature decreased from 35.8°C to 34°C) and then an increase in temperature (35.6°C), upon the administration of atipamezole.
7. The forced wind caused a decrease in the temperature of many different parts of the body as time went by with the fan on. The hind foot started at 33.6°C and decreased to 30.1°C while the fan was on. Once the fan was turned off, the temperature returned back to 33.5°C, Figure 2.

The results for the two types of debris are in progress.

The Bottom Line

There were differences in the infrared radiation captured by cameras when cattle were subjected to different conditions. These factors should be taken into account when infrared analyses are performed. The choice of equipment and accuracy of the image analysis are also key factors for successful use of this technology in the assessment of livestock.

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Have your say on proposed changes to the Meat Regulation

The Ontario Ministry of Agriculture and Food and Ministry of Rural Affairs (OMAF and MRA) are always working to ensure regulations support food safety programs and policies that make sense. As part of our continuous improvement process, we are proposing some changes to the meat regulation to best address food safety without being unnecessarily onerous for businesses. We hope to implement changes in early 2014.